

This listing of claims will replace all prior versions, and listings, of claims in the application.

**Listing of Claims:**

1-37. (canceled).

38. (new) A double balanced mixer for mixing an RF input signal with a local oscillator signal to provide at an output an intermediate frequency signal, comprising:

a first diode ring having a first, second, third and fourth nodes;

a second diode ring having a fifth, sixth, seventh and eighth nodes;

a local oscillator balun for receiving a local oscillator signal at a local oscillator port, the local oscillator balun having first, second, third and fourth windings, the first winding having one end connected to the local oscillator port and the other end connected to the first node, the second winding having both ends connected to ground, the third winding having one end connected to the local oscillator port and the other end connected to ground, the fourth winding having one end connected to ground and the other end connected to the third node and the seventh node;

a radio frequency balun for receiving an RF signal at an RF port, the radio frequency balun having fifth, sixth, seventh and eighth windings, the fifth winding having one end connected to the RF port, the sixth winding having both ends connected to ground, the seventh winding having one end connected to the RF port and another end connected to ground, the eighth winding having one end connected to ground; and

an intermediate frequency balun for providing an intermediate frequency signal at an intermediate frequency port, the intermediate frequency balun having ninth, tenth,

eleventh and twelfth windings, the ninth winding having one end connected to the fifth winding and another end connected to the fourth node, the tenth winding having one end connected to the eighth node and another end connected to the intermediate frequency port, the eleventh winding having one end connected to the second node and another end connected to the intermediate frequency port, the twelfth winding having one end connected to the sixth node and another end connected to the eighth winding.

39. (new) The double balanced mixer according to claim 38, wherein each diode ring comprises:

- a first diode having an anode and a cathode;

- a second diode having an anode and a cathode, the cathode of the first diode connected to the anode of the second diode;

- a third diode having an anode and a cathode, the cathode of the second diode connected to the anode of the third diode; and

- a fourth diode having an anode and a cathode, the cathode of the third diode connected to the anode of the fourth diode and the cathode of the fourth diode connected to the anode of the first diode.

40. (new) The double balanced mixer according to claim 38, wherein parasitic elements of the local oscillator signal are cancelled in the intermediate frequency and radio frequency baluns.

41. (new) The double balanced mixer according to claim 38, wherein isolation between the local oscillator signal and the RF and intermediate frequency signals is increased.

42. (new) A double balanced mixer, comprising:

- a first mixer having first, second, third and fourth nodes;

- a second mixer having fifth, sixth, seventh and eighth nodes, the second mixer coupled in parallel with the first mixer, the first node being connected with the fifth node, the third node connected to the seventh node;

- a local oscillator balun operable to receive a local oscillator signal, the local oscillator balun having a local oscillator port, a first transformer and a second transformer, the first transformer connected to the first node, the second transformer connected to the seventh node, the first and second transformers further connected to the local oscillator port;

- a RF balun operable to receive a RF signal, the RF balun having an RF port, a third transformer and a fourth transformer, the third and fourth transformers connected to the RF port; and

- an intermediate frequency balun operable to provide an intermediate frequency signal, the intermediate frequency balun having an intermediate frequency port, a fifth and a sixth transformer, the fifth transformer connected with the third transformer, the sixth transformer connected with the fourth transformer, the fifth transformer further connected to the fourth and eighth nodes, the sixth transformer further connected to the second and sixth nodes, the fifth and sixth transformers further connected to the intermediate frequency port.

43. (new) The double balanced mixer according to claim 42, wherein the first and second mixers are each ring diodes.

44. (new) The double balanced mixer according to claim 43, wherein the ring diodes each comprise four diodes.

45. (new) The double balanced mixer according to claim 43, wherein each diode ring comprises:

- a first diode having an anode and a cathode;

- a second diode having an anode and a cathode, the cathode of the first diode connected to the anode of the second diode;

- a third diode having an anode and a cathode, the cathode of the second diode connected to the anode of the third diode; and

- a fourth diode having an anode and a cathode, the cathode of the third diode connected to the anode of the fourth diode and the cathode of the fourth diode connected to the anode of the first diode.

46. (new) The double balanced mixer according to claim 42, wherein the first transformer has a first and second winding and the second transformer has a third and fourth winding.

47. (new) The double balanced mixer according to claim 42, wherein the third transformer has a fifth and sixth winding and the fourth transformer has a seventh and eighth winding.

48. (new) The double balanced mixer according to claim 42, wherein the fifth transformer has a ninth and tenth winding and the sixth transformer has an eleventh and twelfth winding.